
Control of Outer Radial Glial Stem Cell Mitosis in the Human Brain.

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Public Summary:

Scientific Abstract:

Evolutionary expansion of the human neocortex is partially attributed to a relative abundance of neural stem cells in the fetal brain called outer radial glia (oRG). oRG cells display a characteristic division mode, mitotic somal translocation (MST), in which the soma rapidly translocates toward the cortical plate immediately prior to cytokinesis. MST may be essential for progenitor zone expansion, but the mechanism of MST is unknown, hindering exploration of its function in development and disease. Here, we show that MST requires activation of the Rho effector ROCK and nonmuscle myosin II, but not intact microtubules, centrosomal translocation into the leading process, or calcium influx. MST is independent of mitosis and distinct from interkinetic nuclear migration and saltatory migration. Our findings suggest that disrupted MST may underlie neurodevelopmental diseases affecting the Rho-ROCK-myosin pathway and provide a foundation for future exploration of the role of MST in neocortical development, evolution, and disease.

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